INFORMATION HANDOUT

For Contract No. 03-1F2304
At 03-Sac,Yol-80-VAR

Identified by
Project ID 0300001109

MATERIALS INFORMATION

Geotechnical Design Report for Ramp Widening and Metering On-Ramp.

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Serious drought.
Help save water!

Memorandum

To: MR. PYO HONG
Acting Branch Chief
Design Branch M11
North Region Division of Project Development

Attn.: Mr. Saeed Aazami

Date: December 4, 2017

File: 03-YOL-80-PM 9.1/11.2
Ramp Widening and
Metering On-Ramp
EA No: 03-1F230
Project ID: 0300001109

Subject: Geotechnical Design Report for Ramp Widening and Metering On-Ramp

This Geotechnical Design Report (GDR) has been prepared by the Office of Geotechnical Design North, Branch B (OGDN, Branch B) as requested by your office for the 2 proposed retaining walls at Reed Avenue slip on-ramp to WB 80 and a fill slope at Enterprise Blvd on-ramp to EB 80.

The purpose of this report is to review and evaluate the proposed retaining walls based on available geological information including groundwater data, as-built plans and Log of Testing Borings (LOTB), and corrosion tests performed in November 2017, for this project.

Proposed Improvements

The proposed retaining walls and fill slope are part of the project to widen the ramp entrance to maintain current standards and to add a ramp metering system. To widen the ramp and to install ramp metering, Standard Plan Type 5 walls were proposed at Reed Avenue slip on-ramp to WB 80 and a fill slope which is proposed at the Enterprise Blvd on-ramp to EB 80.

The general location of the project site is shown on the Vicinity Map in Figure 1.

Geology

The project site is located in the Sacramento Valley region of the Great Valley geomorphic province of California. The Great Valley province is an asymmetrical synclinal trough that extends roughly 400 miles north to south and varies up to 50 miles in width separating the Sierra Nevada Mountains on the east from the Coast Range on the west. The surface of the Great Valley is comprised of up to several thousand feet of Quaternary aged, unconsolidated, marine and non-

marine alluvial deposited sediments. Norrish and Web. (1990). *Geology of California Second Edition.* New York: Wiley.

According to the Geologic Map of the California, (Department of Conservation, 2010), the proposed project site lies on Quaternary aged alluvial deposits (Q), which are composed of alluvium, lake, playa, and terrace deposits that are unconsolidated and semi-consolidated.

Subsurface Investigation

Subsurface conditions observed in the LOTB's from nearby subsurface investigations consist of stiff to very stiff silty clay, clayey silt and clay with locally interbedded sandy and gravelly layers.

Ground Water

Ground water was not encountered in the As-built LOTBs from nearby subsurface investigations.

Scour Potential

There is no scour potential at the site, since the tie-back wall does not span any drainages or watercourses.

Seismic Data Evaluation

The ground motion recommendations are based on the Caltrans 2013 Seismic Design Procedure (SDP) as described in the Appendix B of Seismic Design Criteria (SDC) Version 1.7.

The Acceleration Response Spectrum (ARS) curve is obtained by utilizing Caltrans' ARS Online Tool v2.3.09, as supplemented by the USGS (2008) Interactive Deaggregations (Beta), for the proposed retaining wall site.

The shear wave velocity (Vs30) was determined by using correlations of Standard Penetration Test (SPT) data and effective vertical overburden stress developed in 2010 at University of California, Los Angeles, by Brandenberg, S.J., Bellana, N. and Shantz, T. The average shear wave velocity for the upper 100 feet of subsurface materials is estimated as Vs30 = 900 feet per second (270 m/sec).

Seismicity

Based on the 2013 Caltrans faults database and Caltrans ARS Online Tool (v2.3.09), the site is located about 13.6 miles (21.8 km) east of the Great Valley 03a (Dunnigan Hills) which is the controlling fault for the deterministic seismic design procedure. The Great Valley 03a (Dunnigan Hills) fault parameters are; Fault ID 95, MMax 6.4, Reverse, Bottom and Top of Rupture Plane approximately 6 and 3 km, respectively). The location of the proposed retaining walls and the nearby faults are shown on Figure 2.

Design Response Spectrum

Based on the 2013 SDP, the design response spectrum is the upper envelope of the deterministic and probabilistic response, but is not less than a minimum deterministic response spectrum resulting from a Mmax = 6.5 earthquake on a vertical strike-slip fault at a distance of 7.5 miles (12 km).

The deterministic response spectrum is obtained by taking the arithmetic average of the median response spectrum calculated using the 2008 Campbell-Bozorgnia and 2008 Chiou-Youngs ground motion prediction equations. The probabilistic response spectrum is obtained for 5 percent probability of exceedance in 50 years (corresponding to 975 year return period).

For this site, the design response spectrum is controlled by Probabilistic response spectrum. The corresponding peak horizontal ground acceleration at this site is 0.27g. The acceleration response spectrum is attached as Figure 3.

Fault Rupture Potential

As in most of northern California, the site is considered to be located in a seismically active area. This study included a review of published maps and reports pertaining to faulting in the vicinity of the site. Based on our review, the subject wall is not situated within an Earthquake Fault Zone as defined by the California Geological Survey nor within 1000 feet of a fault that is considered to be Holocene to Latest Pleistocene age (15, 000 years or younger).

The site is located more than 13.6 miles (21.8 km) from the nearest Caltrans defined active fault Great Valley 03a (Dunnigan Hills) fault. The potential for surface rupture from known active faults is considered to be remote, and no further work or design from surface fault rupture is currently required.

Liquefaction

Based on the available subsurface information and groundwater information, the liquefaction potential of the site is low.

Slope Stability

Based on the available subsurface information and because of relatively flat slope, the slope stability may not be an issue.

Corrosion Evaluation

Based on laboratory testing of the samples, the native materials beneath the site are considered not corrosive to foundation elements based on Departmental guidelines. The results of the corrosion testing are attached.

Recommendations

The following recommendations are based on the project plans and cross sections, communication with the D3 Office of Design, and subsurface conditions as determined from existing borings from nearby structures for the proposed Type 5 retaining walls.

A Standard Plan Type 5 Retaining Walls may be constructed along the Reed Avenue on-ramp as proposed. The walls are proposed to have a maximum height of 10 feet. For support of the wall, a spread footing foundation may be used. Due to potential existence of the loose surface soils at the proposed bottom of footing elevation, it is recommended that the soil beneath the retaining wall footing be over- excavated to a depth of 1 foot and the soil be replaced and recompacted to 95% relative compaction to the bottom of footing elevation. The over-excavation shall extend the entire footing width and continue for the entire length of the wall. With the over- excavation as described above, the soil strength will be adequate for support of the wall and settlement is anticipated to be minimal. We recommend using a friction angle of 30 degrees and a unit weight of 120 pcf for the standard plan design. There are no global stability issues for the wall.

The proposed fill slope (1.5:1) at Enterprise Blvd on-ramp to EB 80 shall meet the earthwork requirements of Section 19 of the 2015 Standard Specifications and shall be compacted to 95% relative compaction.

Construction Considerations

According to the as-built Boring records from nearby structures, the subsurface soils consist of silty and sandy soils which are loose in some areas. Temporary shoring may be needed during excavation of the retaining wall footing. Temporary cut slopes and/or shoring are the responsibility of the Contractor.

Project Information

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. None.

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Geotechnical Design Report for EA 03-1F230, dated 12/04/2017.

Data and Information available for inspection at the District Office:

A. None.

Data and Information available for inspection at the Transportation Laboratory are:

A. None.

The analyses, conclusions, and recommendations contained in this report are based upon site conditions that we observed at the time of our investigation, data from our subsurface exploration, and our current understanding of proposed project. We have assumed that the information obtained from our limited subsurface exploration is representative of subsurface conditions throughout the site. If the scope of the proposed project changes from that described in this report, the recommendations should be reviewed by this Office.

Any questions regarding the above report should be directed to the attention of Segaran Logeswaran, (916) 227-1070, or Angel Perez-Cobo, (916) 227-1038 at the Office of Geotechnical Design-North, Branch B.

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Attachments:
- Figure 1. Site Location Map
- Figure 2 - Nearby Major Faults with Reference to the Project Site
- Figure 3 - Recommended Acceleration Response Spectrum (ARS) Curve

cc:
Project Manager
OGDN, Office Chief
Structure Construction RE Pending File
Geotechnical Services Archive System – GEODOG

Figures

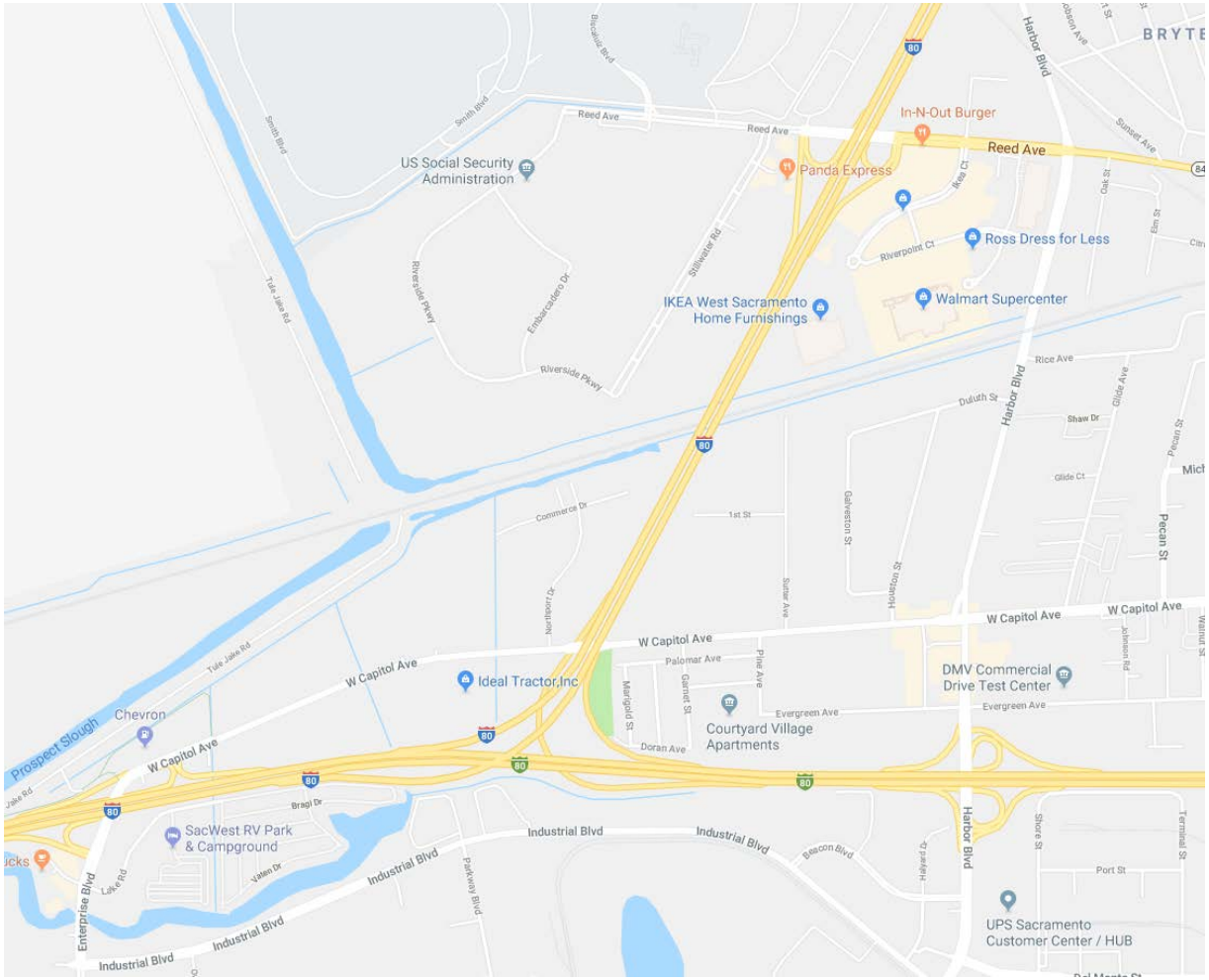

Figure 1 – Project Vicinity Map

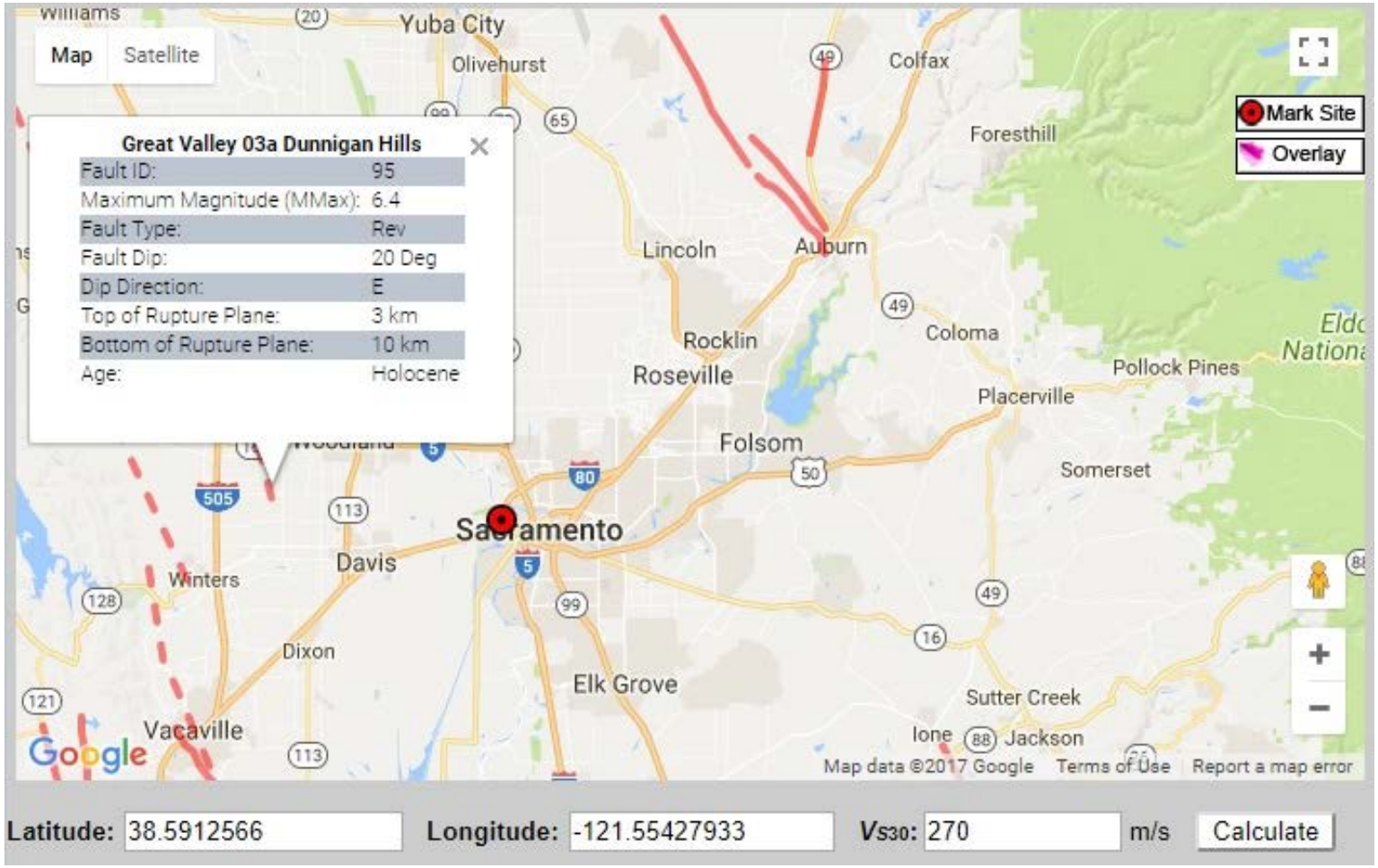

Figure 2 - Nearby Major Faults with Reference to the Project Site

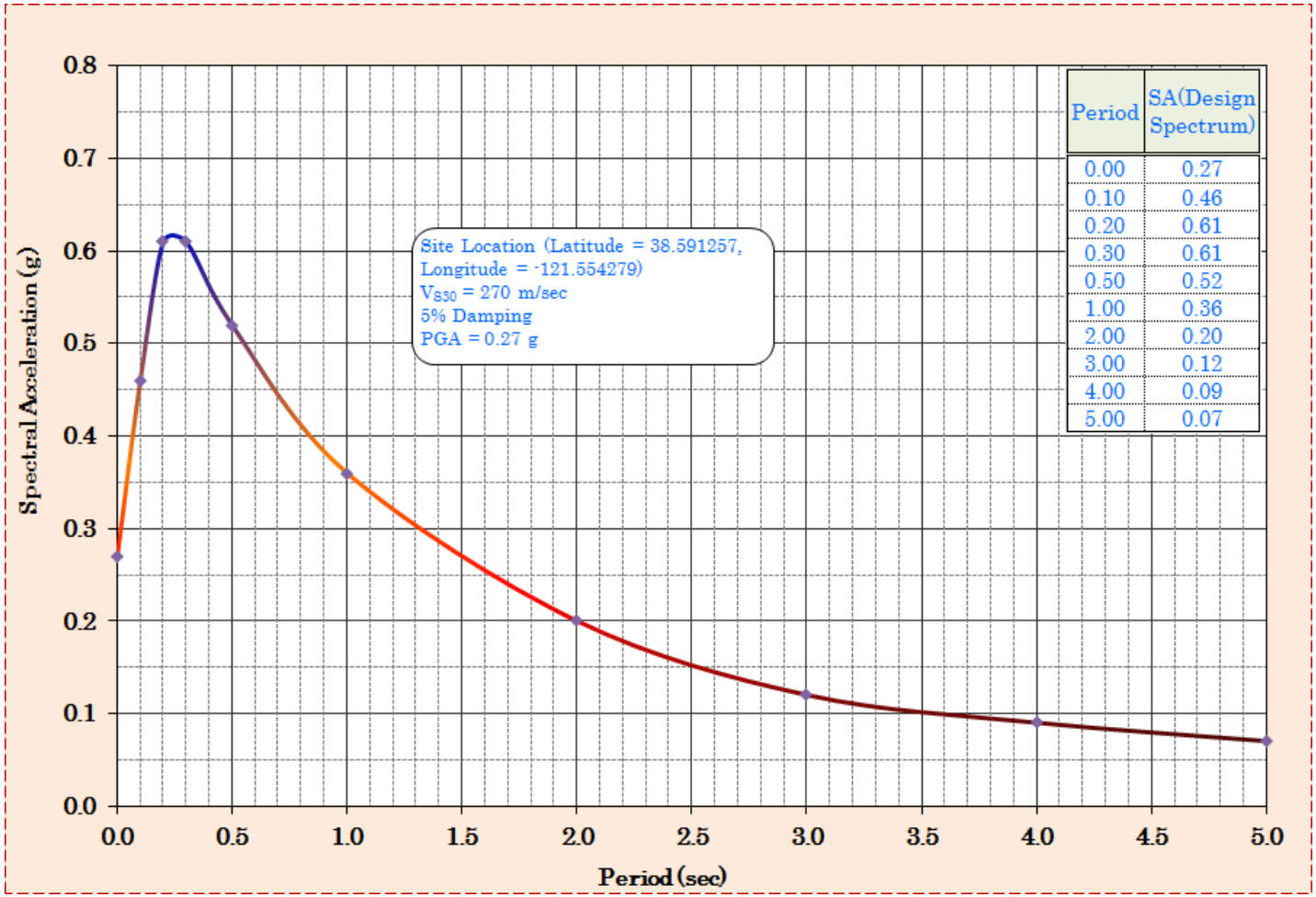

Figure 3 - Recommended Acceleration Response Spectrum (ARS) Curve